

Our Reference: 200209306-1

PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Appellants:	Theodore I. Kamins, et al.
Serial Number:	10/690,688
Filing Date:	October 21, 2003
Confirmation No.:	6130
Examiner/Group Art Unit:	Robert M. Kunemund/1722
Title:	METHOD OF FORMING THREE- DIMENSIONAL NANOCRYSTAL ARRAY

APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please enter the following Reply Brief in response to the Examiner's answer dated January 29, 2008.

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I. STATUS OF CLAIMS

Claims 1, 5-24 and 28-40 are the claims on appeal. *See*, Appendix.

Claims 2-4 and 25-27 were cancelled.

Claims 1, 5-24 and 28-40 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Claims 1, 5-7, 10-18, 20-24 and 28-40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Li et al. (U.S. Patent No. 6,831,017, referred to hereinafter as "Li") in view of Gudiksen et al. ("Growth of nanowire superlattice structures for nanoscale photonics and electronics" Nature, Vol. 415, Feb. 7, 2002, pp. 617-620, referred to hereinafter as "Gudiksen").

Claims 8, 9 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Li in view of Gudiksen.

II. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1, 5-24 and 28-40 are unpatentable under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Whether claims 1, 5-7, 10-18, 20-24 and 28-40 are unpatentable under 35 U.S.C. § 103(a), as being obvious over Li in view of Gudiksen.

Whether claims 8, 9 and 19 are unpatentable under 35 U.S.C. § 103(a), as being obvious over Li in view of Gudiksen.

III. ARGUMENTS

A. Rejection of claims 1, 5-24 and 28-40 under 35 U.S.C. § 112, first paragraph

Appellants note the withdrawal of the § 112, first paragraph rejection in the Examiner's answer dated January 29, 2008.

B. Rejection of claims 1, 5-7, 10-18, 20-24 and 28-40 under 35 U.S.C. § 103(a)

Claims 1, 5-7, 10-18, 20-24 and 28-40 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Gudiksen. The Examiner states that Li fails to teach that the nanowires are made of two different materials. The Examiner then states that Gudiksen teaches growing nanowires having two different materials. The Examiner concludes that it would have been obvious to the skilled artisan to modify Li to have two materials in the nanowire in order to create diverse applications for the nanowire structure.

a. Claims 1, 5, 6, 10-18, 20-24, 28, 29, 38 and 39

Appellants are controllably growing two-material nanowires from a two dimensional surface into a third dimension. Li teaches growing single material nanowires. Gudiksen teaches growing two-material nanowires on a two dimensional surface (it does not appear that the nanowires are attached to the substrate surface), and then removing the nanowires for desired applications.

The Examiner in his Answer still has **not** provided a suggestion gleaned from either of the references as to why a skilled artisan would assume that **methods for growing nanowires in two dimensions, apparently not attached to a substrate surface (Gudiksen)** would be appropriate for incorporating into a method for growing nanowires that remain on a substrate surface (Li). In fact, Appellants submit that the skilled artisan would not be so led to combine Li and Gudiksen in the manner suggested by the Examiner, at least for the reasons set forth below, in Appellants' Appeal Brief dated

October 30, 2007 and in the previously filed Declaration pursuant to 37 C.F.R. § 1.132 (submitted herein as evidence).

The Examiner stated in his Answer that "Appellants admit the reference teaches other substrates and deposition techniques. Thus, the reference does teach the claimed invention, noting that orientation and substrate properties." (Page 5 of Examiner's Answer)

Appellants submit that the above quote is slightly out of context. Appellants will reproduce below just a portion of their argument submitted in their Appeal Brief (at page 9) to place the statement in proper context:

Li does suggest that any suitable technique, such as thermal and plasma chemical vapor deposition, may be used to grow nanowires. Li also states that the substrate may be silicon, other semiconductors, quartz, sapphire, and glass. **However, Li does not teach or suggest that any of these substrates is a single-crystal substrate with the proper orientation (e.g., (111)) for growing vertical nanowires. Appellants submit that without a single-crystal substrate, the nanowires of Li are not likely to grow vertically without the additional exposure to an electric field** (which vertically orients the nanowires of Li, see Col. 5, lines 25-32). (emphasis added)

As such, it can be seen from the above quote that Appellants have pointed out that the "other substrates and deposition techniques" referred to by the Examiner are substrates and techniques that render nanowires not relevant to the Examiner's rejection.

In the Examiner's Answer, he further states:

It is noted, that appellants use the instant figures to support 3d controlled growth. The figures of the Li et al reference are similar in nature to the instant ones. The Li et al reference then must also have the same control in 3d growth as instantly claimed. (Page 5 of Examiner's Answer)

This is taking the Appellants' statements even more out of context. In addition to the Figures, Appellants pointed to many areas throughout their specification detailing controlled growth in 3d, e.g., paragraphs 0013, 0022-0025, 0029-0031, 0039, 0041, 0043 and 0045. Appellants were NOT solely relying on their Figures to support 3d controlled growth.

It is respectfully submitted that the Examiner's assertion that Li's figures look similar to those of the instant application, and thus "**MUST**" also have the same control in 3d growth as instantly claimed" (emphasis added) does not follow logic, but rather is an unsupported, conclusory statement.

In sharp contrast, the Appellants have submitted well reasoned, detailed arguments in their Brief and 1.132 Declaration rebutting the Examiner's assertion that the Li reference teaches or suggests the "same control in 3d growth as instantly claimed."

Further, Appellants also take issue with the Examiner simply dismissing the 132 Declaration because the "declaration is by one of the applicants. It is an opinionary declaration with no factual evidence to support the conclusions set forth by the applicant." It is submitted that the Declaration should not be dismissed simply because the Declarant is one of the Applicants. The Declarant, Dr. Kamins, received his Ph.D. in Electrical Engineering (Solid-State Electronics) 40 years ago. As can be seen from the Declaration, Dr. Kamins also has 40 years of experience as a professor and as a research scientist in the relevant art. It is submitted that his opinion more than suffices as evidence that the Examiner may consider. As such, it is further submitted that the Examiner's dismissal of the 132 Declaration without careful consideration of it was erroneous.

Also on Page 5 of the Examiner's Answer, he states that:

Appellants' argument concerning the combination in view of the electric field is noted. Appellants merely argue one embodiment of the Li et al reference to not combine references. This is unduly limiting the scope and teachings of the Li et al reference.

However, as stated clearly in Appellants' Brief, and quoted above and again here, it is submitted that **"Li does not teach or suggest that any of these substrates is a single-crystal substrate with the proper orientation (e.g., (111)) for growing vertical nanowires. Appellants submit that without a single-crystal substrate, the nanowires of Li are not likely to grow vertically without the additional exposure to an electric field (which vertically orients the nanowires of Li, see Col. 5, lines 25-32)." (emphasis**

added). As such, Appellants have discussed and distinguished this embodiment, because it is the embodiment that may render vertically oriented nanowires.

Appellants are NOT unduly limiting the scope of the Li reference—if the Examiner refers to other embodiments of Li which do not produce vertically oriented nanowires, then even assuming *arguendo* that the skilled artisan combined Li with Gudiksen, such combination would not render obvious Appellants' invention as claimed.

Appellants reiterate their argument regarding the native oxide from their Appeal Brief filed October 30, 2007.

For all of the foregoing reasons and those stated in Appellants' Brief, Appellants submit that Li does not teach the formation of vertical nanowires without the additional exposure to an electric field, and if one skilled in the art were to use the electric field of Li with the nanowires of Gudiksen, such procedures would be so complicated as to render the Examiner's suggested combined process impractical for use and would likely damage at least one segment of the Gudiksen nanowires.

For all of these reasons, Appellants submit that their invention as defined in independent claims 1, 15 and 24, and in those claims depending ultimately therefrom, is not anticipated, taught or rendered obvious by the cited references, either alone or in combination, and patentably defines over the art of record.

b. Claims 7 and 30

Appellants do not agree with the Examiner's statements in his Examiner's Answer, and reiterate their arguments from their Appeal Brief filed October 30, 2007.

c. Claims 31, 32 and 40

Appellants do not agree with the Examiner's statements in his Examiner's Answer, and reiterate their arguments from their Appeal Brief filed October 30, 2007.

d. Claims 33- 37

Appellants do not agree with the Examiner's statements in his Examiner's Answer, and reiterate their arguments from their Appeal Brief filed October 30, 2007.

C. Rejection of claims 8, 9 and 19 under 35 U.S.C. § 103(a)

Claims 8, 9 and 19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Gudiksen. The Examiner **admits** that neither of the references teaches a mold for applying the catalyst material, as recited by the Appellants. The Examiner concludes however, that in the absence of unexpected results, it would have been obvious to one of ordinary skill in the art through routine experimentation to find the optimum, operable means to pattern and apply the catalyst of Li.

a. Claims 8 and 19

Appellants do not agree with the Examiner's statements in his Examiner's Answer, and reiterate their arguments from their Appeal Brief filed October 30, 2007.

b. Claim 9

Appellants do not agree with the Examiner's statements in his Examiner's Answer, and reiterate their arguments from their Appeal Brief filed October 30, 2007.

SUMMARY

The Appellants respectfully submit that claims 1, 5-24 and 28-40 herein fully satisfy the requirements of 35 U.S.C. §§ 112, 102 and 103. In view of the foregoing, favorable consideration and passage to issue of the present application is respectfully requested. If any points remain in issue that may best be resolved through a personal or telephonic interview, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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